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Date of Signature 3/18/02

#6

PATENT

156

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Malouf et al.

Examiner: Not Assigned

**Application No.: 10/029,413**

Group Art Unit: Not Assigned

Filed: December 20, 2001

Docket No.: 421/29/2

Confirmation No.: 3695

For: PURIFIED AND ISOLATED PLATELET CALCIUM CHANNEL NUCLEIC ACIDS AND POLYPEPTIDES AND THERAPEUTIC AND SCREENING METHODS USING SAME

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Respectfully submitted,

JENKINS & WILSON, P.A.

Date: 03/18/2002

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421/29/2 AAT/JAL/sed 25297  
PATENT TRADEMARK OFFICE



#6

## SEQUENCE LISTING

<110> Malouf, Nadia  
Nichols, Timothy C.

<120> Purified and Isolated Platelet Calcium Channel Nucleic Acids and  
Polypeptides and Therapeutic and Screening Methods Using Same

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Thr Val Leu Ser Trp Gln Ala Ala Ile Asp Ala Ala Arg Gln Ala Lys  
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Ala Ala Gln Thr Met Ser Thr Ser Ala Pro Pro Pro Val Gly Ser Leu  
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Ile Tyr Ile Pro Phe Pro Glu Asp Asp Ser Asn Ser Thr Asn His Asn  
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 Leu Pro Leu His Leu Met Gln Gln Gln Ile Met Ala Val Ala Gly  
 1955 1960 1965  
 Leu Asp Ser Ser Lys Ala Gln Lys Tyr Ser Pro Ser His Ser Thr  
 1970 1975 1980  
 Arg Ser Trp Ala Thr Pro Pro Ala Thr Pro Pro Tyr Arg Asp Trp  
 1985 1990 1995  
 Thr Pro Cys Tyr Thr Pro Leu Ile Gln Val Glu Gln Ser Glu Ala  
 2000 2005 2010  
 Leu Asp Gln Val Asn Gly Ser Leu Pro Ser Leu His Arg Ser Ser  
 2015 2020 2025  
 Trp Tyr Thr Asp Glu Pro Asp Ile Ser Tyr Arg Thr Phe Thr Pro  
 2030 2035 2040  
 Ala Ser Leu Thr Val Pro Ser Ser Phe Arg Asn Lys Asn Ser Asp  
 2045 2050 2055  
 Lys Gln Arg Ser Ala Asp Ser Leu Val Glu Ala Val Leu Ile Ser  
 2060 2065 2070  
 Glu Gly Leu Gly Arg Tyr Ala Arg Asp Pro Lys Phe Val Ser Ala  
 2075 2080 2085  
 Thr Lys His Glu Ile Ala Asp Ala Cys Asp Leu Thr Ile Asp Glu  
 2090 2095 2100  
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 2105 2110 2115  
 Arg Ala Asn Gly Asp Val Gly Pro Leu Ser His Arg Gln Asp Tyr  
 2120 2125 2130  
 Glu Leu Gln Asp Phe Gly Pro Gly Tyr Ser Asp Glu Glu Pro Asp  
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<223> n is dATP, dCTP, dGTP, or dTTP

<220>
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<222> (1)..(553)
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<212> DNA
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<223> n is dATP, dCTP, dGTP, or dTTP
      Xaa is any amino acid

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<221> gene
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<223> n is dATP, dCTP, dGTP, or dTTP

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<222> (2282)..(6298)
<223> n is dATP, dCTP, dGTP, or dTTP
      Xaa is any amino acid

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Met Ser Lys Gly Leu Pro Asp Lys Ser Glu Glu Lys Ser Thr Met	
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nnn nnn aca gga ccc cac agc aaa ccc tgt gtg gag atg ctg aag Xaa Xaa Thr Gly Pro His Ser Lys Pro Cys Val Glu Met Leu Lys 1175 1180 1185	5845
gga ctg ctg acc cag agg gca atg ccc aga ggc cag gca cct cct Gly Leu Leu Thr Gln Arg Ala Met Pro Arg Gly Gln Ala Pro Pro 1190 1195 1200	5890

gcc ccc tgc cag tgc ccc agg gtg gag tcc tcc atg cct gag gac	5935
Ala Pro Cys Gln Cys Pro Arg Val Glu Ser Ser Met Pro Glu Asp	
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Arg Lys Ser Ser Thr Pro Gly Ser Leu His Glu Glu Thr Pro His	
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Ser Arg Ser Thr Arg Glu Asn Thr Ser Arg Cys Ser Ala Pro Ala	
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Thr Ala Leu Leu Ile Gln Lys Ala Leu Val Arg Gly Gly Leu Gly	
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Thr Leu Ala Ala Asp Ala Asn Phe Ile Met Ala Thr Gly Gln Ala	
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Leu Ala Asp Ala Cys Gln Met Glu Pro Glu Glu Val Glu Ile Met	
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Ala Thr Glu Leu Leu Lys Gly Arg Glu Ala Pro Glu Gly Met Ala	
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Ser Ser Leu Gly Cys Leu Asn Leu Gly Ser Ser Leu Gly Ser Leu	
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Asp Gln His Gln Gly Ser Gln Glu Thr Leu Ile Pro Pro Arg Leu	
1325 1330 1335	
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<220>
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 <223> The 'Xaa' at location 304 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
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 <222> (305)..(305)  
 <223> The 'Xaa' at location 305 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (306)..(306)  
 <223> The 'Xaa' at location 306 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (307)..(307)  
 <223> The 'Xaa' at location 307 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (308)..(308)  
 <223> The 'Xaa' at location 308 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (309)..(309)  
 <223> The 'Xaa' at location 309 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
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 <222> (310)..(310)  
 <223> The 'Xaa' at location 310 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (311)..(311)  
 <223> The 'Xaa' at location 311 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (312)..(312)  
 <223> The 'Xaa' at location 312 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (313)..(313)  
 <223> The 'Xaa' at location 313 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (314)..(314)  
 <223> The 'Xaa' at location 314 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (315)..(315)  
 <223> The 'Xaa' at location 315 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
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 <222> (316)..(316)  
 <223> The 'Xaa' at location 316 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (317)..(317)  
 <223> The 'Xaa' at location 317 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (318)..(318)  
 <223> The 'Xaa' at location 318 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
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 <222> (319)..(319)  
 <223> The 'Xaa' at location 319 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (320)..(320)  
 <223> The 'Xaa' at location 320 stands for Lys, Asn, Arg, Ser, Thr, Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon, Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (321)..(321)  
 <223> The 'Xaa' at location 321 stands for Lys, Asn, Arg, Ser, Thr, Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon, Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (322)..(322)  
 <223> The 'Xaa' at location 322 stands for Lys, Asn, Arg, Ser, Thr, Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon, Tyr, Trp, Cys, or Phe.

<220>  
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 <222> (323)..(323)  
 <223> The 'Xaa' at location 323 stands for Lys, Asn, Arg, Ser, Thr, Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon, Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (324)..(324)  
 <223> The 'Xaa' at location 324 stands for Lys, Asn, Arg, Ser, Thr, Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon, Tyr, Trp, Cys, or Phe.

<220>  
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 <222> (325)..(325)  
 <223> The 'Xaa' at location 325 stands for Lys, Asn, Arg, Ser, Thr, Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon, Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (326)..(326)  
 <223> The 'Xaa' at location 326 stands for Lys, Asn, Arg, Ser, Thr, Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon, Tyr, Trp, Cys, or Phe.

<220>  
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 <222> (327)..(327)  
 <223> The 'Xaa' at location 327 stands for Lys, Asn, Arg, Ser, Thr, Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon, Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (328)..(328)  
 <223> The 'Xaa' at location 328 stands for Lys, Asn, Arg, Ser, Thr, Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon, Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (329)..(329)  
 <223> The 'Xaa' at location 329 stands for Lys, Asn, Arg, Ser, Thr, Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon, Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (330)..(330)  
 <223> The 'Xaa' at location 330 stands for Lys, Asn, Arg, Ser, Thr, Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon, Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (331)..(331)  
 <223> The 'Xaa' at location 331 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (1076)..(1076)  
 <223> The 'Xaa' at location 1076 stands for Gln, His, Arg, Pro, or Leu.

<220>  
 <221> misc\_feature  
 <222> (1077)..(1077)  
 <223> The 'Xaa' at location 1077 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (1078)..(1078)  
 <223> The 'Xaa' at location 1078 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
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 <222> (1079)..(1079)  
 <223> The 'Xaa' at location 1079 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (1080)..(1080)  
 <223> The 'Xaa' at location 1080 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (1081)..(1081)  
 <223> The 'Xaa' at location 1081 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (1082)..(1082)  
 <223> The 'Xaa' at location 1082 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (1083)..(1083)  
 <223> The 'Xaa' at location 1083 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (1084)..(1084)  
 <223> The 'Xaa' at location 1084 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (1085)..(1085)  
 <223> The 'Xaa' at location 1085 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (1086)..(1086)  
 <223> The 'Xaa' at location 1086 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
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 <222> (1087)..(1087)  
 <223> The 'Xaa' at location 1087 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
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 <222> (1088)..(1088)  
 <223> The 'Xaa' at location 1088 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
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 <222> (1089)..(1089)  
 <223> The 'Xaa' at location 1089 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
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 <222> (1090)..(1090)  
 <223> The 'Xaa' at location 1090 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (1091)..(1091)  
 <223> The 'Xaa' at location 1091 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (1092)..(1092)  
 <223> The 'Xaa' at location 1092 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
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 <222> (1093)..(1093)  
 <223> The 'Xaa' at location 1093 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
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 <222> (1094)..(1094)  
 <223> The 'Xaa' at location 1094 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
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 <222> (1095)..(1095)  
 <223> The 'Xaa' at location 1095 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (1096)..(1096)  
 <223> The 'Xaa' at location 1096 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.



<220>  
 <221> misc\_feature  
 <222> (1097)..(1097)  
 <223> The 'Xaa' at location 1097 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
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 <222> (1098)..(1098)  
 <223> The 'Xaa' at location 1098 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
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 <222> (1099)..(1099)  
 <223> The 'Xaa' at location 1099 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (1100)..(1100)  
 <223> The 'Xaa' at location 1100 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (1101)..(1101)  
 <223> The 'Xaa' at location 1101 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (1102)..(1102)  
 <223> The 'Xaa' at location 1102 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (1103)..(1103)  
 <223> The 'Xaa' at location 1103 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (1104)..(1104)  
 <223> The 'Xaa' at location 1104 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (1105)..(1105)  
 <223> The 'Xaa' at location 1105 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (1106)..(1106)  
 <223> The 'Xaa' at location 1106 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (1107)..(1107)  
 <223> The 'Xaa' at location 1107 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

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<220>
<221> misc_feature
<222> (1108)..(1108)
<223> The 'Xaa' at location 1108 stands for Lys, Asn, Arg, Ser, Thr, Ile,
Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,
Tyr, Trp, Cys, or Phe.

<220>
<221> misc_feature
<222> (1109)..(1109)
<223> The 'Xaa' at location 1109 stands for Lys, Asn, Arg, Ser, Thr, Ile,
Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,
Tyr, Trp, Cys, or Phe.

<220>
<221> misc_feature
<222> (1110)..(1110)
<223> The 'Xaa' at location 1110 stands for Lys, Asn, Arg, Ser, Thr, Ile,
Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,
Tyr, Trp, Cys, or Phe.

<220>
<221> misc_feature
<222> (1111)..(1111)
<223> The 'Xaa' at location 1111 stands for Lys, Asn, Arg, Ser, Thr, Ile,
Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,
Tyr, Trp, Cys, or Phe.

<220>
<221> misc_feature
<222> (1112)..(1112)
<223> The 'Xaa' at location 1112 stands for Lys, Asn, Arg, Ser, Thr, Ile,
Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,
Tyr, Trp, Cys, or Phe.

<220>
<221> misc_feature
<222> (1113)..(1113)
<223> The 'Xaa' at location 1113 stands for Lys, Asn, Arg, Ser, Thr, Ile,
Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,
Tyr, Trp, Cys, or Phe.

<220>
<221> misc_feature
<222> (1114)..(1114)
<223> The 'Xaa' at location 1114 stands for Lys, Asn, Arg, Ser, Thr, Ile,
Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,
Tyr, Trp, Cys, or Phe.

<220>
<221> misc_feature
<222> (1115)..(1115)
<223> The 'Xaa' at location 1115 stands for Lys, Asn, Arg, Ser, Thr, Ile,
Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,
Tyr, Trp, Cys, or Phe.

<220>
<221> misc_feature
<222> (1116)..(1116)
<223> The 'Xaa' at location 1116 stands for Lys, Asn, Arg, Ser, Thr, Ile,
Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,
Tyr, Trp, Cys, or Phe.

<220>
<221> misc_feature
<222> (1117)..(1117)
<223> The 'Xaa' at location 1117 stands for Lys, Asn, Arg, Ser, Thr, Ile,
Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,
Tyr, Trp, Cys, or Phe.

<220>
<221> misc_feature
<222> (1118)..(1118)
<223> The 'Xaa' at location 1118 stands for Lys, Asn, Arg, Ser, Thr, Ile,
Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,
Tyr, Trp, Cys, or Phe.

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<220>  
 <221> misc\_feature  
 <222> (1119)..(1119)  
 <223> The 'Xaa' at location 1119 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (1120)..(1120)  
 <223> The 'Xaa' at location 1120 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (1121)..(1121)  
 <223> The 'Xaa' at location 1121 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (1122)..(1122)  
 <223> The 'Xaa' at location 1122 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (1123)..(1123)  
 <223> The 'Xaa' at location 1123 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (1124)..(1124)  
 <223> The 'Xaa' at location 1124 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (1125)..(1125)  
 <223> The 'Xaa' at location 1125 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (1126)..(1126)  
 <223> The 'Xaa' at location 1126 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
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 <222> (1127)..(1127)  
 <223> The 'Xaa' at location 1127 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (1128)..(1128)  
 <223> The 'Xaa' at location 1128 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (1129)..(1129)  
 <223> The 'Xaa' at location 1129 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

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<220>
<221> misc_feature
<222> (1130)..(1130)
<223> The 'Xaa' at location 1130 stands for Lys, Asn, Arg, Ser, Thr, Ile,
Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,
Tyr, Trp, Cys, or Phe.

<220>
<221> misc_feature
<222> (1131)..(1131)
<223> The 'Xaa' at location 1131 stands for Lys, Asn, Arg, Ser, Thr, Ile,
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Tyr, Trp, Cys, or Phe.

<220>
<221> misc_feature
<222> (1132)..(1132)
<223> The 'Xaa' at location 1132 stands for Lys, Asn, Arg, Ser, Thr, Ile,
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Tyr, Trp, Cys, or Phe.

<220>
<221> misc_feature
<222> (1133)..(1133)
<223> The 'Xaa' at location 1133 stands for Lys, Asn, Arg, Ser, Thr, Ile,
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Tyr, Trp, Cys, or Phe.

<220>
<221> misc_feature
<222> (1134)..(1134)
<223> The 'Xaa' at location 1134 stands for Lys, Asn, Arg, Ser, Thr, Ile,
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Tyr, Trp, Cys, or Phe.

<220>
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<222> (1135)..(1135)
<223> The 'Xaa' at location 1135 stands for Lys, Asn, Arg, Ser, Thr, Ile,
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<220>
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<222> (1136)..(1136)
<223> The 'Xaa' at location 1136 stands for Lys, Asn, Arg, Ser, Thr, Ile,
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Tyr, Trp, Cys, or Phe.

<220>
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<222> (1137)..(1137)
<223> The 'Xaa' at location 1137 stands for Lys, Asn, Arg, Ser, Thr, Ile,
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Tyr, Trp, Cys, or Phe.

<220>
<221> misc_feature
<222> (1138)..(1138)
<223> The 'Xaa' at location 1138 stands for Lys, Asn, Arg, Ser, Thr, Ile,
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Tyr, Trp, Cys, or Phe.

<220>
<221> misc_feature
<222> (1139)..(1139)
<223> The 'Xaa' at location 1139 stands for Lys, Asn, Arg, Ser, Thr, Ile,
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Tyr, Trp, Cys, or Phe.

<220>
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<223> The 'Xaa' at location 1140 stands for Lys, Asn, Arg, Ser, Thr, Ile,
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<220>
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<223> The 'Xaa' at location 1141 stands for Lys, Asn, Arg, Ser, Thr, Ile,
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Tyr, Trp, Cys, or Phe.

<220>
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<223> The 'Xaa' at location 1142 stands for Lys, Asn, Arg, Ser, Thr, Ile,
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Tyr, Trp, Cys, or Phe.

<220>
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<223> The 'Xaa' at location 1143 stands for Lys, Asn, Arg, Ser, Thr, Ile,
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Tyr, Trp, Cys, or Phe.

<220>
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<222> (1144)..(1144)
<223> The 'Xaa' at location 1144 stands for Lys, Asn, Arg, Ser, Thr, Ile,
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Tyr, Trp, Cys, or Phe.

<220>
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<222> (1145)..(1145)
<223> The 'Xaa' at location 1145 stands for Lys, Asn, Arg, Ser, Thr, Ile,
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Tyr, Trp, Cys, or Phe.

<220>
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<222> (1146)..(1146)
<223> The 'Xaa' at location 1146 stands for Lys, Asn, Arg, Ser, Thr, Ile,
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Tyr, Trp, Cys, or Phe.

<220>
<221> misc_feature
<222> (1147)..(1147)
<223> The 'Xaa' at location 1147 stands for Lys, Asn, Arg, Ser, Thr, Ile,
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Tyr, Trp, Cys, or Phe.

<220>
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<222> (1148)..(1148)
<223> The 'Xaa' at location 1148 stands for Lys, Asn, Arg, Ser, Thr, Ile,
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Tyr, Trp, Cys, or Phe.

<220>
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<222> (1149)..(1149)
<223> The 'Xaa' at location 1149 stands for Lys, Asn, Arg, Ser, Thr, Ile,
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Tyr, Trp, Cys, or Phe.

<220>
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<223> The 'Xaa' at location 1150 stands for Lys, Asn, Arg, Ser, Thr, Ile,
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Tyr, Trp, Cys, or Phe.

<220>
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<222> (1151)..(1151)
<223> The 'Xaa' at location 1151 stands for Lys, Asn, Arg, Ser, Thr, Ile,
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Tyr, Trp, Cys, or Phe.

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<220>  
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 Tyr, Trp, Cys, or Phe.

<220>  
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 <223> The 'Xaa' at location 1153 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
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 Tyr, Trp, Cys, or Phe.

<220>  
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 <223> The 'Xaa' at location 1154 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
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 Tyr, Trp, Cys, or Phe.

<220>  
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 Tyr, Trp, Cys, or Phe.

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 <223> The 'Xaa' at location 1157 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
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 Tyr, Trp, Cys, or Phe.

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 Tyr, Trp, Cys, or Phe.

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 Tyr, Trp, Cys, or Phe.

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 Tyr, Trp, Cys, or Phe.

<220>  
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 Tyr, Trp, Cys, or Phe.

<220>  
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 <223> The 'Xaa' at location 1162 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
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 Tyr, Trp, Cys, or Phe.

<220>  
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 <223> The 'Xaa' at location 1163 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
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 <223> The 'Xaa' at location 1164 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
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 Tyr, Trp, Cys, or Phe.

<220>  
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 <223> The 'Xaa' at location 1165 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
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 Tyr, Trp, Cys, or Phe.

<220>  
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 <223> The 'Xaa' at location 1166 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
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 Tyr, Trp, Cys, or Phe.

<220>  
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 <223> The 'Xaa' at location 1167 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
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 <223> The 'Xaa' at location 1168 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

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 <223> The 'Xaa' at location 1169 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
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 <223> The 'Xaa' at location 1170 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
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 <223> The 'Xaa' at location 1171 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
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 <223> The 'Xaa' at location 1172 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
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 Tyr, Trp, Cys, or Phe.

<220>  
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 <223> The 'Xaa' at location 1173 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

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<220>
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<222> (1174)..(1174)
<223> The 'Xaa', at location 1174 stands for Lys, Asn, Arg, Ser, Thr, Ile,
Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,
Tyr, Trp, Cys, or Phe.

<220>
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<222> (1175)..(1175)
<223> The 'Xaa' at location 1175 stands for Lys, Asn, Arg, Ser, Thr, Ile,
Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,
Tyr, Trp, Cys, or Phe.

<220>
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<223> n is dATP, dCTP, dGTP, or dTTP; Xaa is any amino acid
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Asp Pro Tyr Pro Ser Ala Asp Phe Pro Gly Asp Asp Glu Glu Asp Glu
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Pro Glu Ile Pro Leu Ser Pro Arg Pro Arg Pro Leu Ala Glu Leu Gln
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Leu Lys Glu Lys Ala Val Pro Ile Pro Glu Ala Ser Ser Phe Phe Ile
85 90 95

Phe Ser Pro Thr Asn Lys Ile Arg Val Leu Cys His Arg Ile Val Asn
100 105 110

Ala Thr Trp Phe Thr Asn Phe Ile Leu Leu Phe Ile Leu Leu Ser Ser
115 120 125

Ala Ala Leu Ala Ala Glu Asp Pro Ile Arg Ala Asp Ser Met Arg Asn
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Gln Ile Leu Lys His Phe Asp Ile Gly Phe Thr Ser Val Phe Thr Val
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Glu Ile Val Leu Lys Met Thr Thr Tyr Gly Ala Phe Leu His Lys Gly
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Ser Phe Cys Arg Asn Tyr Phe Asn Met Leu Asp Leu Leu Val Val Ala
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Val Ser Leu Ile Ser Met Gly Leu Glu Ser Ser Ala Ile Ser Val Val
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Lys Ile Leu Arg Val Leu Arg Val Leu Arg Pro Leu Arg Ala Ile Asn
210 215 220

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 Cys Tyr Ile Pro Lys Asn Pro Tyr Gln Tyr Gln Val Trp Tyr Ile Val  
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 Gly Lys Phe Cys Pro His Arg Val Ala Cys Lys Arg Leu Val Gly Met  
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Thr Leu Ala Ala Asp Ala Asn Phe Ile Met Ala Thr Gly Gln Ala  
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70 75 80	
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Gly Leu Glu Lys Leu Glu Tyr Phe Phe Leu Ile Val Phe Ser Ile Glu	
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 Cys Val Ala Leu Ala Val Tyr Leu Pro Met Pro Glu Asp Asp Asn Asn  
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Ser Leu Asn Leu Gly Leu Glu Lys Leu Glu Tyr Phe Phe Leu Ile Val  
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Phe Ser Ile Glu Ala Ala Met Lys Ile Ile Ala Tyr Gly Phe Leu Phe  
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ctc acc cgg gac tgg tcc atc ctg ggc cct cat cac ctg gat gag Leu Thr Arg Asp Trp Ser Ile Leu Gly Pro His His Leu Asp Glu 1390 1395 1400	4428

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Ile Lys His Leu	Asp Val Val Thr	Leu Arg Arg Ile Gln Pro	
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Pro Leu Gly Phe	Gly Lys Phe Cys	His Arg Val Ala Cys Lys	
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Thr Phe Asn Ala	Thr Leu Phe Ala	Val Arg Thr Ala Leu Lys	
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Ile Lys Thr Glu	Gly Asn Phe Glu	Ala Asn Glu Glu Leu Arg	
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Ala Ile Ile Lys	Lys Ile Trp Lys	Thr Ser Met Lys Leu Leu	
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Lys Phe Tyr Ala	Thr Phe Leu Ile	Glu His Phe Arg Lys Phe	
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Met Lys Arg Gln	Glu Glu Tyr Tyr	Tyr Arg Pro Lys Lys Asp	
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Ile Val Gln Ile	Gln Ala Gly Leu	Thr Ile Glu Glu Glu Ala	
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Ala Pro Glu Ile	Cys Arg Thr Val	Gly Asp Leu Ala Ala Glu	
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Glu Glu Leu Glu	Arg Ala Met Val	Ala Ala Met Glu Glu Gly	
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Leu Glu Arg Thr	Asn Ser Leu Pro	Val Met Ala Asn Gln Arg	
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Val Phe Leu Glu	Asp Phe Pro Gln	Pro Arg Thr Asn Pro Leu	
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gct cgt gcc aat	acc aac aat gcc aac	gcc aat gtc gcc tat gcg	5238
Ala Arg Ala Asn	Thr Asn Asn Ala	Ala Asn Val Ala Tyr Ala	
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Asn Ser Asn His	Ser Asn Ser His	Val Phe Ser Ser Val His Tyr	
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cga gcc ctt ggc caa ccc tgc agg tcc ctg gga ccc cac agc aaa Arg Ala Leu Gly Gln Pro Cys Arg Ser Leu Gly Pro His Ser Lys 1705 1710 1715	5373
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gag tcc tcc atg cct gag gac aga aag agc tcc aca cca ggg tct Glu Ser Ser Met Pro Glu Asp Arg Lys Ser Ser Thr Pro Gly Ser 1750 1755 1760	5508
ctt cat gag gag aca ccc cac agc agg agc acc agg gag aat act Leu His Glu Glu Thr Pro His Ser Arg Ser Thr Arg Glu Asn Thr 1765 1770 1775	5553
tcc agg tgc tca gca cca gct aca gcc ctg ctg atc caa aag gct Ser Arg Cys Ser Ala Pro Ala Thr Ala Leu Leu Ile Gln Lys Ala 1780 1785 1790	5598
ctg gtt cga ggg ggc ctg ggc acc ttg gca gct gat gca aac ttc Leu Val Arg Gly Gly Leu Gly Thr Leu Ala Ala Asp Ala Asn Phe 1795 1800 1805	5643
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 Cys Val Ala Leu Ala Val Tyr Leu Pro Met Pro Glu Asp Asp Asn Asn  
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Phe Arg Cys Val Arg Leu Leu Arg Ile Phe Lys Val Thr Arg His Trp	
175 180 185	
act tcc ctg agc aac tta gtg gca tcc tta tta aac tcc atg aag tcc	2127
Thr Ser Leu Ser Asn Leu Val Ala Ser Leu Leu Asn Ser Met Lys Ser	
190 195 200	
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Ile Ala Ser Leu Leu Leu Leu Phe Leu Phe Ile Ile Ile Phe Ser	
205 210 215 220	
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Leu Leu Gly Met Gln Leu Phe Gly Gly Lys Phe Asn Phe Asp Glu Thr	
225 230 235	



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ggc atc atg gct tac ggg ggc cca tcc tct tca gga atg atc gtc tgc Gly Ile Met Ala Tyr Gly Gly Pro Ser Ser Ser Gly Met Ile Val Cys 270 275 280	2367
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<220>
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 <223> The 'Xaa' at location 395 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
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 Tyr, Trp, Cys, or Phe.

<220>  
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<220>  
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 <223> The 'Xaa' at location 405 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
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<220>  
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 <223> The 'Xaa' at location 410 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
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 <223> The 'Xaa' at location 412 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
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<220>  
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 <223> The 'Xaa' at location 414 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
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<220>  
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 <223> The 'Xaa' at location 417 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
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<220>  
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 <223> The 'Xaa' at location 418 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
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 <223> The 'Xaa' at location 419 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
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 <222> (420)..(420)  
 <223> The 'Xaa' at location 420 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
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 <222> (421)..(421)  
 <223> The 'Xaa' at location 421 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
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 Tyr, Trp, Cys, or Phe.

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 <223> The 'Xaa' at location 422 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
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 Tyr, Trp, Cys, or Phe.

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 <223> The 'Xaa' at location 423 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
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 Tyr, Trp, Cys, or Phe.

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 <223> The 'Xaa' at location 424 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
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 Tyr, Trp, Cys, or Phe.

<220>  
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 <223> The 'Xaa' at location 426 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
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 Tyr, Trp, Cys, or Phe.

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 <223> The 'Xaa' at location 427 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
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 Tyr, Trp, Cys, or Phe.

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 <223> The 'Xaa' at location 428 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
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 <223> The 'Xaa' at location 429 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
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 Tyr, Trp, Cys, or Phe.

<220>  
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 <222> (430)..(430)  
 <223> The 'Xaa' at location 430 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
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 Tyr, Trp, Cys, or Phe.

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 <223> The 'Xaa' at location 431 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
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 <222> (432)..(432)  
 <223> The 'Xaa' at location 432 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
 Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,  
 Tyr, Trp, Cys, or Phe.

<220>  
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 <222> (433)..(433)  
 <223> The 'Xaa' at location 433 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
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<220>  
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 <222> (434)..(434)  
 <223> The 'Xaa' at location 434 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
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 Tyr, Trp, Cys, or Phe.

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 <223> The 'Xaa' at location 435 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
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 Tyr, Trp, Cys, or Phe.

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 <223> The 'Xaa' at location 439 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
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 <223> The 'Xaa' at location 440 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
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<220>  
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 <223> The 'Xaa' at location 441 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
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 Tyr, Trp, Cys, or Phe.

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<220>
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<223> The 'Xaa' at location 442 stands for Lys, Asn, Arg, Ser, Thr, Ile,
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Tyr, Trp, Cys, or Phe.

<220>
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<222> (443)..(443)
<223> The 'Xaa' at location 443 stands for Lys, Asn, Arg, Ser, Thr, Ile,
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Tyr, Trp, Cys, or Phe.

<220>
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<222> (444)..(444)
<223> The 'Xaa' at location 444 stands for Lys, Asn, Arg, Ser, Thr, Ile,
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Tyr, Trp, Cys, or Phe.

<220>
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<222> (445)..(445)
<223> The 'Xaa' at location 445 stands for Lys, Asn, Arg, Ser, Thr, Ile,
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Tyr, Trp, Cys, or Phe.

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<222> (446)..(446)
<223> The 'Xaa' at location 446 stands for Lys, Asn, Arg, Ser, Thr, Ile,
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Tyr, Trp, Cys, or Phe.

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<222> (447)..(447)
<223> The 'Xaa' at location 447 stands for Lys, Asn, Arg, Ser, Thr, Ile,
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Tyr, Trp, Cys, or Phe.

<220>
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<222> (448)..(448)
<223> The 'Xaa' at location 448 stands for Lys, Asn, Arg, Ser, Thr, Ile,
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Tyr, Trp, Cys, or Phe.

<220>
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<222> (449)..(449)
<223> The 'Xaa' at location 449 stands for Lys, Asn, Arg, Ser, Thr, Ile,
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Tyr, Trp, Cys, or Phe.

<220>
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<222> (450)..(450)
<223> The 'Xaa' at location 450 stands for Lys, Asn, Arg, Ser, Thr, Ile,
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<223> The 'Xaa' at location 451 stands for Lys, Asn, Arg, Ser, Thr, Ile,
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Tyr, Trp, Cys, or Phe.

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<222> (452)..(452)
<223> The 'Xaa' at location 452 stands for Lys, Asn, Arg, Ser, Thr, Ile,
Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,
Tyr, Trp, Cys, or Phe.

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<220>  
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 <223> The 'Xaa' at location 453 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
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 Tyr, Trp, Cys, or Phe.

<220>  
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 <223> The 'Xaa' at location 454 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
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 Tyr, Trp, Cys, or Phe.

<220>  
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 <223> The 'Xaa' at location 455 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
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 Tyr, Trp, Cys, or Phe.

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 <223> The 'Xaa' at location 456 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
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 <222> (457)..(457)  
 <223> The 'Xaa' at location 457 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
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 <223> The 'Xaa' at location 458 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
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 Tyr, Trp, Cys, or Phe.

<220>  
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 <223> The 'Xaa' at location 459 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
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 Tyr, Trp, Cys, or Phe.

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 <223> The 'Xaa' at location 460 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
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<220>  
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 <223> The 'Xaa' at location 461 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
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 Tyr, Trp, Cys, or Phe.

<220>  
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 Tyr, Trp, Cys, or Phe.

<220>  
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 <223> The 'Xaa' at location 463 stands for Lys, Asn, Arg, Ser, Thr, Ile,  
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 Tyr, Trp, Cys, or Phe.

<220>  
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 <222> (464)..(464)  
 <223> The 'Xaa' at location 464 stands for Lys, Asn, Arg, Ser, Thr, Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon, Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
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 <223> The 'Xaa' at location 465 stands for Lys, Asn, Arg, Ser, Thr, Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon, Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (466)..(466)  
 <223> The 'Xaa' at location 466 stands for Lys, Asn, Arg, Ser, Thr, Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon, Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
 <222> (467)..(467)  
 <223> The 'Xaa' at location 467 stands for Lys, Asn, Arg, Ser, Thr, Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon, Tyr, Trp, Cys, or Phe.

<220>  
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 <222> (468)..(468)  
 <223> The 'Xaa' at location 468 stands for Lys, Asn, Arg, Ser, Thr, Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon, Tyr, Trp, Cys, or Phe.

<220>  
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 <222> (469)..(469)  
 <223> The 'Xaa' at location 469 stands for Lys, Asn, Arg, Ser, Thr, Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon, Tyr, Trp, Cys, or Phe.

<220>  
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 <222> (470)..(470)  
 <223> The 'Xaa' at location 470 stands for Lys, Asn, Arg, Ser, Thr, Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon, Tyr, Trp, Cys, or Phe.

<220>  
 <221> misc\_feature  
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 <223> The 'Xaa' at location 471 stands for Lys, Asn, Arg, Ser, Thr, Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon, Tyr, Trp, Cys, or Phe.

<220>  
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 <223> The 'Xaa' at location 472 stands for Lys, Asn, Arg, Ser, Thr, Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon, Tyr, Trp, Cys, or Phe.

<220>  
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 <222> (473)..(473)  
 <223> The 'Xaa' at location 473 stands for Lys, Asn, Arg, Ser, Thr, Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon, Tyr, Trp, Cys, or Phe.

<220>  
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 <222> (474)..(474)  
 <223> The 'Xaa' at location 474 stands for Lys, Asn, Arg, Ser, Thr, Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon, Tyr, Trp, Cys, or Phe.

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<220>
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<222> (475)..(475)
<223> The 'Xaa' at location 475 stands for Lys, Asn, Arg, Ser, Thr, Ile,
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Tyr, Trp, Cys, or Phe.

<220>
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<222> (476)..(476)
<223> The 'Xaa' at location 476 stands for Lys, Asn, Arg, Ser, Thr, Ile,
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Tyr, Trp, Cys, or Phe.

<220>
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<222> (477)..(477)
<223> The 'Xaa' at location 477 stands for Lys, Asn, Arg, Ser, Thr, Ile,
Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,
Tyr, Trp, Cys, or Phe.

<220>
<221> misc_feature
<222> (478)..(478)
<223> The 'Xaa' at location 478 stands for Lys, Asn, Arg, Ser, Thr, Ile,
Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,
Tyr, Trp, Cys, or Phe.

<220>
<221> misc_feature
<222> (479)..(479)
<223> The 'Xaa' at location 479 stands for Lys, Asn, Arg, Ser, Thr, Ile,
Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,
Tyr, Trp, Cys, or Phe.

<220>
<221> misc_feature
<222> (480)..(480)
<223> The 'Xaa' at location 480 stands for Lys, Asn, Arg, Ser, Thr, Ile,
Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,
Tyr, Trp, Cys, or Phe.

<220>
<221> misc_feature
<222> (481)..(481)
<223> The 'Xaa' at location 481 stands for Lys, Asn, Arg, Ser, Thr, Ile,
Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,
Tyr, Trp, Cys, or Phe.

<220>
<221> misc_feature
<222> (482)..(482)
<223> The 'Xaa' at location 482 stands for Lys, Asn, Arg, Ser, Thr, Ile,
Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, a stop codon,
Tyr, Trp, Cys, or Phe.

<220>
<221> misc_feature
<222> (1516)..(6834)
<223> n is dATP, dCTP, dGTP, or dTTP; Xaa is any amino acid

<400> 16
Met Pro Thr Ser Glu Thr Glu Ser Val Asn Thr Glu Asn Val Ser Gly
1          5          10          15

Glu Gly Glu Asn Arg Gly Cys Cys Gly Ser Leu Trp Cys Trp Trp Arg
20          25          30

Arg Arg Gly Ala Ala Lys Ala Gly Pro Ser Gly Cys Arg Arg Trp Gly
35          40          45

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Gln Ala Ile Ser Lys Ser Lys Leu Ser Arg Arg Trp Arg Arg Trp Asn  
 50 55 60

Arg Phe Asn Arg Arg Arg Cys Arg Ala Ala Val Lys Ser Val Thr Phe  
 65 70 75 80

Tyr Trp Leu Val Ile Val Leu Val Phe Leu Asn Thr Leu Thr Ile Ser  
 85 90 95

Ser Glu His Tyr Asn Gln Pro Asp Trp Leu Thr Gln Ile Gln Asp Met  
 100 105 110

Pro Asn Lys Val Leu Leu Ala Leu Phe Thr Cys Glu Met Leu Val Lys  
 115 120 125

Met Tyr Ser Leu Gly Leu Gln Ala Tyr Phe Val Ser Leu Phe Asn Arg  
 130 135 140

Phe Asp Cys Phe Val Val Cys Gly Gly Ile Thr Glu Thr Ile Leu Val  
 145 150 155 160

Glu Leu Glu Ile Met Ser Pro Leu Gly Ile Ser Val Phe Arg Cys Val  
 165 170 175

Arg Leu Leu Arg Ile Phe Lys Val Thr Arg His Trp Thr Ser Leu Ser  
 180 185 190

Asn Leu Val Ala Ser Leu Leu Asn Ser Met Lys Ser Ile Ala Ser Leu  
 195 200 205

Leu Leu Leu Leu Phe Leu Phe Ile Ile Ile Phe Ser Leu Leu Gly Met  
 210 215 220

Gln Leu Phe Gly Gly Lys Phe Asn Phe Asp Glu Thr Gln Thr Lys Arg  
 225 230 235 240

Ser Thr Phe Asp Asn Phe Pro Gln Ala Leu Leu Thr Val Phe Gln Ile  
 245 250 255

Leu Thr Gly Glu Asp Trp Asn Ala Val Met Tyr Asp Gly Ile Met Ala  
 260 265 270

Tyr Gly Gly Pro Ser Ser Ser Gly Met Ile Val Cys Ile Tyr Phe Ile  
 275 280 285

Ile Leu Phe Ile Cys Gly Asn Tyr Ile Leu Leu Asn Val Phe Leu Ala  
 290 295 300

Ile Ala Val Asp Asn Leu Ala Asp Ala Glu Ser Leu Asn Thr Ala Gln  
 305 310 315 320

Lys Glu Glu Ala Glu Glu Lys Glu Arg Lys Lys Ile Ala Arg Lys Glu  
 325 330 335

Ser Leu Glu Asn Lys Lys Asn Asn Lys Pro Glu Val Asn Gln Ile Ala  
 340 345 350



Asn Ser Asp Asn Lys Val Thr Ile Asp Asp Tyr Arg Glu Glu Asp Glu  
 355 360 365  
 Asp Lys Asp Pro Tyr Pro Pro Cys Asp Val Pro Gly Met Val Xaa Xaa  
 370 375 380  
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
 385 390 395 400  
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
 405 410 415  
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
 420 425 430  
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
 435 440 445  
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 450 455 460  
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
 465 470 475 480  
 Xaa Xaa Pro Cys Arg Ile Arg Val Gly Cys His Lys Leu Ile Asn His  
 485 490 495  
 His Ile Phe Thr Asn Leu Ile Leu Val Phe Ile Met Leu Ser Ser Ala  
 500 505 510  
 Ala Leu Ala Ala Glu Asp Pro Ile Arg Ser His Ser Phe Arg Asn Thr  
 515 520 525  
 Ile Leu Gly Tyr Phe Asp Tyr Ala Phe Thr Ala Ile Phe Thr Val Glu  
 530 535 540  
 Ile Leu Leu Lys Met Thr Thr Phe Gly Ala Phe Leu His Lys Gly Ala  
 545 550 555 560  
 Phe Cys Arg Asn Tyr Phe Asn Leu Leu Asp Met Leu Val Val Gly Val  
 565 570 575  
 Ser Leu Val Ser Phe Gly Ile Gln Ser Ser Ala Ile Ser Val Val Lys  
 580 585 590  
 Ile Leu Arg Val Leu Arg Val Leu Arg Pro Leu Arg Ala Ile Asn Arg  
 595 600 605  
 Ala Lys Gly Leu Lys His Val Val Gln Cys Val Phe Val Ala Ile Arg  
 610 615 620  
 Thr Ile Gly Asn Ile Met Ile Val Thr Thr Leu Leu Gln Phe Met Phe  
 625 630 635 640  
 Ala Cys Ile Gly Val Gln Leu Phe Lys Gly Lys Phe Tyr Arg Cys Thr  
 645 650 655

Asp Glu Ala Lys Ser Asn Pro Glu Glu Cys Arg Gly Leu Phe Ile Leu  
 660 665 670  
 Tyr Lys Asp Gly Asp Val Asp Ser Pro Val Val Arg Glu Arg Ile Trp  
 675 680 685  
 Gln Asn Ser Asp Phe Asn Phe Asp Asn Val Leu Ser Ala Met Met Ala  
 690 695 700  
 Leu Phe Thr Val Ser Thr Phe Glu Gly Trp Pro Ala Leu Leu Tyr Lys  
 705 710 715 720  
 Ala Ile Asp Ser Asn Gly Glu Asn Ile Gly Pro Ile Tyr Asn His Arg  
 725 730 735  
 Val Glu Ile Ser Ile Phe Phe Ile Ile Tyr Ile Ile Ile Val Ala Phe  
 740 745 750  
 Phe Met Met Asn Ile Phe Val Gly Phe Val Ile Val Thr Phe Gln Glu  
 755 760 765  
 Gln Gly Glu Lys Glu Tyr Lys Asn Cys Glu Leu Asp Lys Asn Gln Arg  
 770 775 780  
 Gln Cys Val Glu Tyr Ala Leu Lys Ala Arg Pro Leu Arg Arg Tyr Ile  
 785 790 795 800  
 Pro Lys Asn Pro Tyr Gln Tyr Lys Phe Trp Tyr Val Val Asn Ser Ser  
 805 810 815  
 Pro Phe Glu Tyr Met Met Phe Val Leu Ile Met Leu Asn Thr Leu Cys  
 820 825 830  
 Leu Ala Met Gln His Tyr Glu Gln Ser Lys Met Phe Asn Asp Ala Met  
 835 840 845  
 Asp Ile Leu Asn Met Val Phe Thr Gly Val Phe Thr Val Glu Met Val  
 850 855 860  
 Leu Lys Val Ile Ala Phe Lys Pro Lys Gly Tyr Phe Ser Asp Ala Trp  
 865 870 875 880  
 Asn Thr Phe Asp Ser Leu Ile Val Ile Gly Ser Ile Ile Asp Val Ala  
 885 890 895  
 Leu Ser Glu Ala Lys Pro Thr Glu Ser Glu Asn Val Pro Val Pro Thr  
 900 905 910  
 Ala Thr Pro Gly Asn Ser Glu Glu Ser Asn Arg Ile Ser Ile Thr Phe  
 915 920 925  
 Phe Arg Leu Phe Arg Val Met Arg Leu Val Lys Leu Leu Ser Arg Gly  
 930 935 940  
 Glu Gly Ile Arg Thr Leu Leu Trp Thr Phe Ile Lys Ser Phe Gln Ala  
 945 950 955 960

Leu Pro Tyr Val Ala Leu Leu Ile Ala Met Leu Phe Phe Ile Tyr Ala  
 965 970 975  
 Val Ile Gly Met Gln Met Phe Gly Lys Val Ala Met Arg Asp Asn Asn  
 980 985 990  
 Gln Ile Asn Arg Asn Asn Asn Phe Gln Thr Phe Pro Gln Ala Val Leu  
 995 1000 1005  
 Leu Leu Phe Arg Cys Ala Thr Gly Glu Ala Trp Gln Glu Ile Met  
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 Leu Ala Cys Leu Pro Gly Lys Leu Cys Asp Pro Glu Ser Asp Tyr  
 1025 1030 1035  
 Asn Pro Gly Glu Glu Tyr Thr Cys Gly Ser Asn Phe Ala Ile Val  
 1040 1045 1050  
 Tyr Phe Ile Ser Phe Tyr Met Leu Cys Ala Phe Leu Ile Ile Asn  
 1055 1060 1065  
 Leu Phe Val Ala Val Ile Met Asp Asn Phe Asp Tyr Leu Thr Arg  
 1070 1075 1080  
 Asp Trp Ser Ile Leu Gly Pro His His Leu Asp Glu Phe Lys Arg  
 1085 1090 1095  
 Ile Trp Ser Glu Tyr Asp Pro Glu Ala Lys Gly Arg Ile Lys His  
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 Leu Asp Val Val Thr Leu Leu Arg Arg Ile Gln Pro Pro Leu Gly  
 1115 1120 1125  
 Phe Gly Lys Leu Cys Pro His Arg Val Ala Cys Lys Arg Leu Val  
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 Ala Met Asn Met Pro Leu Asn Ser Asp Gly Thr Val Met Phe Asn  
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 Ala Thr Leu Phe Ala Leu Val Arg Thr Ala Leu Lys Ile Lys Thr  
 1160 1165 1170  
 Glu Gly Asn Leu Glu Gln Ala Asn Glu Glu Leu Arg Ala Val Ile  
 1175 1180 1185  
 Lys Lys Ile Trp Lys Lys Thr Ser Met Lys Leu Leu Asp Gln Val  
 1190 1195 1200  
 Val Pro Pro Ala Gly Asp Asp Glu Val Thr Val Gly Lys Phe Tyr  
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 Ala Thr Phe Leu Ile Gln Asp Tyr Phe Arg Lys Phe Lys Lys Arg  
 1220 1225 1230  
 Lys Glu Gln Gly Leu Val Gly Lys Tyr Pro Ala Lys Asn Thr Thr  
 1235 1240 1245

Ile Ala Leu Gln Ala Gly Leu Arg Thr Leu His Asp Ile Gly Pro  
 1250 1255 1260  
 Glu Ile Arg Arg Ala Ile Ser Cys Asp Leu Gln Asp Asp Glu Pro  
 1265 1270 1275  
 Glu Glu Thr Lys Arg Glu Glu Glu Asp Asp Val Phe Lys Arg Asn  
 1280 1285 1290  
 Gly Ala Leu Leu Gly Asn His Val Asn His Val Asn Ser Asp Arg  
 1295 1300 1305  
 Arg Asp Ser Leu Gln Gln Thr Asn Thr Thr His Arg Pro Leu His  
 1310 1315 1320  
 Val Gln Arg Pro Ser Ile Pro Pro Ala Ser Asp Thr Glu Lys Pro  
 1325 1330 1335  
 Leu Phe Pro Pro Ala Gly Asn Ser Val Cys His Asn His His Asn  
 1340 1345 1350  
 His Asn Ser Ile Gly Lys Gln Val Pro Thr Ser Thr Asn Ala Asn  
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 Leu Asn Asn Ala Asn Met Ser Lys Ala Ala His Gly Lys Arg Pro  
 1370 1375 1380  
 Ser Ile Gly Asn Leu Glu His Val Ser Glu Asn Gly His His Ser  
 1385 1390 1395  
 Ser His Lys His Asp Arg Glu Pro Gln Arg Arg Ser Ser Val Lys  
 1400 1405 1410  
 Arg Thr Arg Tyr Tyr Glu Thr Tyr Ile Arg Ser Asp Ser Gly Asp  
 1415 1420 1425  
 Glu Gln Leu Pro Thr Ile Cys Arg Glu Asp Pro Glu Ile His Gly  
 1430 1435 1440  
 Tyr Phe Arg Asp Pro His Cys Leu Gly Glu Gln Glu Tyr Phe Ser  
 1445 1450 1455  
 Ser Glu Glu Cys Tyr Glu Asp Asp Ser Ser Pro Thr Trp Ser Arg  
 1460 1465 1470  
 Gln Asn Tyr Gly Tyr Tyr Ser Arg Tyr Pro Gly Arg Asn Ile Asp  
 1475 1480 1485  
 Ser Glu Arg Pro Arg Gly Tyr His His Pro Gln Gly Phe Leu Glu  
 1490 1495 1500  
 Asp Asp Asp Ser Pro Val Cys Tyr Asp Ser Arg Arg Ser Pro Arg  
 1505 1510 1515  
 Arg Arg Leu Leu Pro Pro Thr Pro Ala Ser His Arg Arg Ser Ser  
 1520 1525 1530

Phe Asn Phe Glu Cys Leu Arg Arg Gln Ser Ser Gln Glu Glu Val  
 1535 1540 1545  
 Pro Ser Ser Pro Ile Phe Pro His Arg Thr Ala Leu Pro Leu His  
 1550 1555 1560  
 Leu Met Gln Gln Gln Ile Met Ala Val Ala Gly Leu Asp Ser Ser  
 1565 1570 1575  
 Lys Ala Gln Lys Tyr Ser Pro Ser His Ser Thr Arg Ser Trp Ala  
 1580 1585 1590  
 Thr Pro Pro Ala Thr Pro Pro Tyr Arg Asp Trp Thr Pro Cys Tyr  
 1595 1600 1605  
 Thr Pro Leu Ile Gln Val Glu Gln Ser Glu Ala Leu Asp Gln Val  
 1610 1615 1620  
 Asn Gly Ser Leu Pro Ser Leu His Arg Ser Ser Trp Tyr Thr Asp  
 1625 1630 1635  
 Glu Pro Asp Ile Ser Tyr Arg Thr Phe Thr Pro Ala Ser Leu Thr  
 1640 1645 1650  
 Val Pro Ser Ser Phe Arg Asn Lys Asn Ser Asp Lys Gln Arg Ser  
 1655 1660 1665  
 Ala Asp Ser Leu Val Glu Ala Val Leu Ile Ser Glu Gly Leu Gly  
 1670 1675 1680  
 Arg Tyr Ala Arg Asp Pro Lys Phe Val Ser Ala Thr Lys His Glu  
 1685 1690 1695  
 Ile Ala Asp Ala Cys Asp Leu Thr Ile Asp Glu Met Glu Ser Ala  
 1700 1705 1710  
 Ala Ser Thr Leu Leu Asn Gly Asn Val Arg Pro Arg Ala Asn Gly  
 1715 1720 1725  
 Asp Val Gly Pro Leu Ser His Arg Gln Asp Tyr Glu Leu Gln Asp  
 1730 1735 1740  
 Phe Gly Pro Gly Tyr Ser Asp Glu Glu Pro Asp Pro Gly Arg Asp  
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 Glu Glu Asp Leu Ala Asp Glu Met Ile Cys Ile Thr Thr Leu  
 1760 1765 1770

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 <212> DNA  
 <213> Homo sapiens  
 <220>  
 <221> gene  
 <222> (1)..(7193)  
 <223>

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<220>
<221> CDS
<222> (119)..(6664)
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atg atg atg atg atg atg atg aaa aaa atg cag cat caa cgg cag cag 166
Met Met Met Met Met Met Met Lys Lys Met Gln His Gln Arg Gln Gln
1 5 10 15
caa gcg gac cac gcg aac gag gca aac tat gca aga ggc acc aga ctt 214
Gln Ala Asp His Ala Asn Glu Ala Asn Tyr Ala Arg Gly Thr Arg Leu
20 25 30
cct ctt tct ggt gaa gga cca act tct cag ccg aat agc tcc aag caa 262
Pro Leu Ser Gly Glu Gly Pro Thr Ser Gln Pro Asn Ser Ser Lys Gln
35 40 45
act gtc ctg tct tgg caa gct gca atc gat gct gct aga cag gcc aag 310
Thr Val Leu Ser Trp Gln Ala Ala Ile Asp Ala Ala Arg Gln Ala Lys
50 55 60
gct gcc caa act atg agc acc tct gca ccc cca cct gta gga tct ctc 358
Ala Ala Gln Thr Met Ser Thr Ser Ala Pro Pro Pro Val Gly Ser Leu
65 70 75 80
tcc caa aga aaa cgt cag caa tac gcc aag agc aaa aaa cag ggt aac 406
Ser Gln Arg Lys Arg Gln Gln Tyr Ala Lys Ser Lys Lys Gln Gly Asn
85 90 95
tcg tcc aac agc cga cct gcc cgc gcc ctt ttc tgt tta tca ctc aat 454
Ser Ser Asn Ser Arg Pro Ala Arg Ala Leu Phe Cys Leu Ser Leu Asn
100 105 110
aac ccc atc cga aga gcc tgc att agt ata gtg gaa tgg aaa cca ttt 502
Asn Pro Ile Arg Arg Ala Cys Ile Ser Ile Val Glu Trp Lys Pro Phe
115 120 125
gac ata ttt ata tta ttg gct att ttt gcc aat tgt gtg gcc tta gct 550
Asp Ile Phe Ile Leu Leu Ala Ile Phe Ala Asn Cys Val Ala Leu Ala
130 135 140
att tac atc cca ttc cct gaa gat gat tct aat tca aca aat cat aac 598
Ile Tyr Ile Pro Phe Pro Glu Asp Asp Ser Asn Ser Thr Asn His Asn
145 150 155 160
ttg gaa aaa gta gaa tat gcc ttc ctg att att ttt aca gtc gag aca 646
Leu Glu Lys Val Glu Tyr Ala Phe Leu Ile Ile Phe Thr Val Glu Thr
165 170 175
ttt ttg aag att ata gcg tat gga tta ttg cta cat cct aat gct tat 694
Phe Leu Lys Ile Ile Ala Tyr Gly Leu Leu Leu His Pro Asn Ala Tyr
180 185 190
gtt agg aat gga tgg aat tta ctg gat ttt gtt ata gta ata gta gga 742
Val Arg Asn Gly Trp Asn Leu Leu Asp Phe Val Ile Val Ile Val Gly
195 200 205
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Leu Phe Ser Val Ile Leu Glu Gln Leu Thr Lys Glu Thr Glu Gly Gly
210 215 220
aac cac tca agc ggc aaa tct gga ggc ttt gat gtc aaa gcc ctc cgt 838
Asn His Ser Ser Gly Lys Ser Gly Gly Phe Asp Val Lys Ala Leu Arg
225 230 235 240
gcc ttt cga gtg ttg cga cca ctt cga cta gtg tca ggg gtg ccc agt 886
Ala Phe Arg Val Leu Arg Pro Leu Arg Leu Val Ser Gly Val Pro Ser
245 250 255

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tta caa gtt gtc ctg aac tcc att ata aaa gcc atg gtt ccc ctc ctt Leu Gln Val Val Leu Asn Ser Ile Ile Lys Ala Met Val Pro Leu Leu 260 265 270	934
cac ata gcc ctt ttg gta tta ttt gta atc ata atc tat gct att ata His Ile Ala Leu Leu Val Leu Phe Val Ile Ile Ile Tyr Ala Ile Ile 275 280 285	982
gga ttg gaa ctt ttt att gga aaa atg cac aaa aca tgt ttt ttt gct Gly Leu Glu Leu Phe Ile Gly Lys Met His Lys Thr Cys Phe Phe Ala 290 295 300	1030
gac tca gat atc gta gct gaa gag gac cca gct cca tgt gcg ttc tca Asp Ser Asp Ile Val Ala Glu Glu Asp Pro Ala Pro Cys Ala Phe Ser 305 310 315 320	1078
ggg aat gga cgc cag tgt act gcc aat ggc acg gaa tgt agg agt ggc Gly Asn Gly Arg Gln Cys Thr Ala Asn Gly Thr Glu Cys Arg Ser Gly 325 330 335	1126
tgg gtt ggc ccg aac gga ggc atc acc aac ttt gat aac ttt gcc ttt Trp Val Gly Asn Gly Gly Ile Thr Asn Phe Asp Asn Phe Ala Phe 340 345 350	1174
gcc atg ctt act gtg ttt cag tgc atc acc atg gag ggc tgg aca gac Ala Met Leu Thr Val Phe Gln Cys Ile Thr Met Glu Gly Trp Thr Asp 355 360 365	1222
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gtt ctt ggt gtc ctt agt gga gaa ttc tca aag gaa aga gag aag gca Val Leu Gly Val Leu Ser Gly Glu Phe Ser Lys Glu Arg Glu Lys Ala 405 410 415	1366
aaa gca cgg gga gat ttc cag aag ctc cgg gag aag cag cag ctg gag Lys Ala Arg Gly Asp Phe Gln Lys Leu Arg Glu Lys Gln Gln Leu Glu 420 425 430	1414
gag gat cta aag ggc tac ttg gat tgg atc acc caa gct gag gac atc Glu Asp Leu Lys Gly Tyr Leu Asp Trp Ile Thr Gln Ala Glu Asp Ile 435 440 445	1462
gat ccg gag aat gag gaa gaa gga gga gag gaa ggc aaa cga aat act Asp Pro Glu Asn Glu Glu Glu Gly Gly Glu Glu Gly Lys Arg Asn Thr 450 455 460	1510
agc atg ccc acc agc gag act gag tct gtg aac aca gag aac gtc agc Ser Met Pro Thr Ser Glu Thr Glu Ser Val Asn Thr Glu Asn Val Ser 465 470 475 480	1558
ggt gaa ggc gag aac cga ggc tgc tgt gga agt ctc tgg tgc tgg tgg Gly Glu Gly Glu Asn Arg Gly Cys Cys Gly Ser Leu Trp Cys Trp Trp 485 490 495	1606
aga cgg aga ggc gcg gcc aag gcg ggg ccc tct ggg tgt cgg cgg tgg Arg Arg Arg Gly Ala Ala Lys Ala Gly Pro Ser Gly Cys Arg Arg Trp 500 505 510	1654
ggt caa gcc atc tca aaa tcc aaa ctc agc cga cgc tgg cgt cgc tgg Gly Gln Ala Ile Ser Lys Ser Lys Leu Ser Arg Arg Trp Arg Arg Trp 515 520 525	1702
aac cga ttc aat cgc aga aga tgt agg gcc gcc gtg aag tct gtc acg Asn Arg Phe Asn Arg Arg Cys Arg Ala Ala Val Lys Ser Val Thr 530 535 540	1750
ttt tac tgg ctg gtt atc gtc ctg gtg ttt ctg aac acc tta acc att Phe Tyr Trp Leu Val Ile Val Leu Val Phe Leu Asn Thr Leu Thr Ile 545 550 555 560	1798

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att gcc aac aaa gtc ctc ttg gct ctg ttc acc tgc gag atg ctg gta Ile Ala Asn Lys Val Leu Leu Ala Leu Phe Thr Cys Glu Met Leu Val 580 585 590	1894
aaa atg tac agc ttg ggc ctc caa gca tat ttc gtc tct ctt ttc aac Lys Met Tyr Ser Leu Gly Leu Gln Ala Tyr Phe Val Ser Leu Phe Asn 595 600 605	1942
cgg ttt gat tgc ttc gtg gtg tgt ggt gga atc act gag acg atc ctg Arg Phe Asp Cys Phe Val Val Cys Gly Gly Ile Thr Glu Thr Ile Leu 610 615 620	1990
gtg gaa ctg gaa atc atg tct ccc ctg ggg atc tct gtg ttt cgg tgt Val Glu Leu Glu Ile Met Ser Pro Leu Gly Ile Ser Val Phe Arg Cys 625 630 635 640	2038
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agc aac tta gtg gca tcc tta tta aac tcc atg aag tcc atc gct tcg Ser Asn Leu Val Ala Ser Leu Leu Asn Ser Met Lys Ser Ile Ala Ser 660 665 670	2134
ctg ttg ctt ctg ctt ttt ctc ttc att atc atc ttt tcc ttg ctt ggg Leu Leu Leu Leu Leu Phe Leu Phe Ile Ile Phe Ser Leu Leu Gly 675 680 685	2182
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gct tac ggg ggc cca tcc tct tca gga atg atc gtc tgc atc tac ttc Ala Tyr Gly Gly Pro Ser Ser Ser Gly Met Ile Val Cys Ile Tyr Phe 740 745 750	2374
atc atc ctc ttc att tgt ggt aac tat att cta ctg aat gtc ttc ttg Ile Ile Leu Phe Ile Cys Gly Asn Tyr Ile Leu Leu Asn Val Phe Leu 755 760 765	2422
gcc atc gct gta gac aat ttg gct gat gct gaa agt ctg aac act gct Ala Ile Ala Val Asp Asn Leu Ala Asp Ala Glu Ser Leu Asn Thr Ala 770 775 780	2470
cag aaa gaa gaa gcg gaa gaa aag gag agg aaa aag att gcc aga aaa Gln Lys Glu Glu Ala Glu Glu Lys Glu Arg Lys Lys Ile Ala Arg Lys 785 790 795 800	2518
gag agc cta gaa aat aaa aag aac aac aaa cca gaa gtc aac cag ata Glu Ser Leu Glu Asn Lys Lys Asn Asn Lys Pro Glu Val Asn Gln Ile 805 810 815	2566
gcc aac agt gac aac aag gtt aca att gat gac tat aga gaa gag gat Ala Asn Ser Asp Asn Lys Val Thr Ile Asp Asp Tyr Arg Glu Glu Asp 820 825 830	2614
gaa gac aag gac ccc tat ccg cct tgc gat gtg cca gta ggg gaa gag Glu Asp Lys Asp Pro Tyr Pro Cys Asp Val Pro Val Gly Glu Glu 835 840 845	2662
gaa gag gaa gag gag gag gat gaa cct gag gtt cct gcc gga ccc cgt Glu Glu Glu Glu Glu Glu Asp Glu Pro Glu Val Pro Ala Gly Pro Arg 850 855 860	2710



cct cga agg atc tcg gag ttg aac atg aag gaa aaa att gcc ccc atc Pro Arg Arg Ile Ser Glu Leu Asn Met Lys Glu Lys Ile Ala Pro Ile 865 870 875 880	2758
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gta ggc tgc cac aag ctc atc aac cac cac atc ttc acc aac ctc atc Val Gly Cys His Lys Leu Ile Asn His His Ile Phe Thr Asn Leu Ile 900 905 910	2854
ctt gtc ttc atc atg ctg agc agc gct gcc ctg gcc gca gag gac ccc Leu Val Phe Ile Met Leu Ser Ser Ala Ala Leu Ala Ala Glu Asp Pro 915 920 925	2902
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gcc ttc aca gcc atc ttt act gtt gag atc ctg ttg aag atg aca act Ala Phe Thr Ala Ile Phe Thr Val Glu Ile Leu Leu Lys Met Thr Thr 945 950 955 960	2998
ttt gga gct ttc ctc cac aaa ggg gcc ttc tgc agg aac tac ttc aat Phe Gly Ala Phe Leu His Lys Gly Ala Phe Cys Arg Asn Tyr Phe Asn 965 970 975	3046
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Pro Leu Ser Gly Glu Gly Pro Thr Ser Gln Pro Asn Ser Ser Lys Gln  
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Thr Val Leu Ser Trp Gln Ala Ala Ile Asp Ala Ala Arg Gln Ala Lys  
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Ser Gln Arg Lys Arg Gln Gln Tyr Ala Lys Ser Lys Lys Gln Gly Asn  
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Ser Ser Asn Ser Arg Pro Ala Arg Ala Leu Phe Cys Leu Ser Leu Asn  
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Asn Pro Ile Arg Arg Ala Cys Ile Ser Ile Val Glu Trp Lys Pro Phe  
                   115                                  120                                  125

Asp Ile Phe Ile Leu Leu Ala Ile Phe Ala Asn Cys Val Ala Leu Ala  
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Ile Tyr Ile Pro Phe Pro Glu Asp Asp Ser Asn Ser Thr Asn His Asn  
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Leu Glu Lys Val Glu Tyr Ala Phe Leu Ile Ile Phe Thr Val Glu Thr  
                   165                                  170                                  175

Phe Leu Lys Ile Ile Ala Tyr Gly Leu Leu Leu His Pro Asn Ala Tyr  
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Val Arg Asn Gly Trp Asn Leu Leu Asp Phe Val Ile Val Ile Val Gly  
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Asn His Ser Ser Gly Lys Ser Gly Gly Phe Asp Val Lys Ala Leu Arg  
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Ala Phe Arg Val Leu Arg Pro Leu Arg Leu Val Ser Gly Val Pro Ser  
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His Ile Ala Leu Leu Val Leu Phe Val Ile Ile Ile Tyr Ala Ile Ile  
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165                               170                               175                               180

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Ser Leu Gln Val Val Leu Asn Ser Ile Phe Lys Ala Met Leu Pro Leu
185                               190                               195

ttc cac atc gcc ctg ctc gtc ctc ttc atg gtc atc atc tac gcc atc      861
Phe His Ile Ala Leu Leu Val Leu Phe Met Val Ile Ile Tyr Ala Ile
200                               205                               210

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atc ggg ctg gag ctc ttc aag ggc aag atg cac aag acc tgc tac tac Ile Gly Leu Glu Leu Phe Lys Gly Lys Met His Lys Thr Cys Tyr Tyr 215 220 225	909
atc ggg aca gac atc gtg gcc aca gtg gag aat gag aag ccc tgc ccc Ile Gly Thr Asp Ile Val Ala Thr Val Glu Asn Glu Lys Pro Ser Pro 230 235 240	957
tgc gct agg acg ggc tgc ggg cgc ccc tgc acc atc aac ggc agc gag Cys Ala Arg Thr Gly Ser Gly Arg Pro Cys Thr Ile Asn Gly Ser Glu 245 250 255 260	1005
tgc cgg ggc ggc tgg cgg ggg ccc aac cac ggc atc acg cac ttc gac Cys Arg Gly Gly Trp Pro Gly Pro Asn His Gly Ile Thr His Phe Asp 265 270 275	1053
aac ttc ggc ttc tcc atg ctc acc gtg tac cag tgc atc acc atg gag Asn Phe Gly Phe Ser Met Leu Thr Val Tyr Gln Cys Ile Thr Met Glu 280 285 290	1101
ggc tgg aca gat gtc ctc tac tgg gtc aac gat gcc atc ggg aac gag Gly Trp Thr Asp Val Leu Tyr Trp Val Asn Asp Ala Ile Gly Asn Glu 295 300 305	1149
tgg ccc tgg atc tac ttt gtc act ctc atc ctg ctg ggg tcc ttc ttc Trp Pro Trp Ile Tyr Phe Val Thr Leu Ile Leu Leu Gly Ser Phe Phe 310 315 320	1197
atc ctc aac ctg gtg ctg ggc gtc ctg agt ggg gaa ttc acc aag gag Ile Leu Asn Leu Val Leu Gly Val Leu Ser Gly Glu Phe Thr Lys Glu 325 330 335 340	1245
cgg gag aag gcc aag tcc agg gga acc ttc cag aag ctg cgg gag aag Arg Glu Lys Ala Lys Ser Arg Gly Thr Phe Gln Lys Leu Arg Glu Lys 345 350 355	1293
cag cag ctg gag gag gac ctt cgg ggc tac atg agc tgg atc acg cag Gln Gln Leu Glu Glu Asp Leu Arg Gly Tyr Met Ser Trp Ile Thr Gln 360 365 370	1341
ggc gag gtc atg gac gtg gag gac ctg aga gaa gga aag ctg tcc ttg Gly Glu Val Met Asp Val Glu Asp Leu Arg Glu Gly Lys Leu Ser Leu 375 380 385	1389
gaa gag gga ggc tcc gac acg gaa agc ctg tac gaa atc gag ggc ttg Glu Glu Gly Gly Ser Asp Thr Glu Ser Leu Tyr Glu Ile Glu Gly Leu 390 395 400	1437
aac aaa atc atc cag ttc atc cga cac tgg agg cag tgg aac cgt gtc Asn Lys Ile Ile Gln Phe Ile Arg His Trp Arg Gln Trp Asn Arg Val 405 410 415 420	1485
ttt cgc tgg aag tgc cat gac ctg gtg aag tgc aga gtc ttc tac tgg Phe Arg Trp Lys Cys His Asp Leu Val Lys Ser Arg Val Phe Tyr Trp 425 430 435	1533
ctg gtc atc ctg atc gtg gcc ctc aac acc ctg tcc atc gcc tgc gag Leu Val Ile Leu Ile Val Ala Leu Asn Thr Leu Ser Ile Ala Ser Glu 440 445 450	1581
cac cac aac cag ccg ctc tgg ctg acc cac ttg caa gac atc gcc aat His His Asn Gln Pro Leu Trp Leu Thr His Leu Gln Asp Ile Ala Asn 455 460 465	1629
cga gtg ctg ctg tca ctc ttc acc atc gag atg ctg ctg aag atg tac Arg Val Leu Leu Ser Leu Phe Thr Ile Glu Met Leu Leu Lys Met Tyr 470 475 480	1677
ggg ctg ggc ctg cgc cag tac ttc atg tcc atc ttc aac cgc ttc gac Gly Leu Gly Leu Arg Gln Tyr Phe Met Ser Ile Phe Asn Arg Phe Asp 485 490 495 500	1725
tgc ttc gtg gtg tgc agc ggc atc ctg gag ctg ctg ctg gtg gag tgc Cys Phe Val Val Cys Ser Gly Ile Leu Glu Leu Leu Leu Val Glu Ser 505 510 515	1773

ggc gcc atg acg ccg ctg ggc atc tcc gtg ttg cgc tgc atc cgc ctc Gly Ala Met Thr Pro Leu Gly Ile Ser Val Leu Arg Cys Ile Arg Leu 520 525 530	1821
ctg agg ctc ttc aag atc acc aag tac tgg acg tcg ctc agc aac ctg Leu Arg Leu Phe Lys Ile Thr Lys Tyr Trp Thr Ser Leu Ser Asn Leu 535 540 545	1869
gtg gcc tcc ctg ctc aac tcc atc cgc tcc atc gcc tcg ctg ctg ctg Val Ala Ser Leu Leu Asn Ser Ile Arg Ser Ile Ala Ser Leu Leu Leu 550 555 560	1917
ctg ctc ttc ctc ttc atc atc atc ttc gcc ctg ctg ggc atg cag ctc Leu Leu Phe Leu Phe Ile Ile Ile Phe Ala Leu Leu Gly Met Gln Leu 565 570 575 580	1965
ttc ggg ggg cgg tac gac ttc gag gac acg gaa gtg cga cgc agc aac Phe Gly Gly Arg Tyr Asp Phe Glu Asp Thr Glu Val Arg Arg Ser Asn 585 590 595	2013
ttc gac aac ttc ccc cag gcc ctc atc agc gtc ttc cag gtg ctg acg Phe Asp Asn Phe Pro Gln Ala Leu Ile Ser Val Phe Gln Val Leu Thr 600 605 610	2061
ggg gag gac tgg aac tcc gtg atg tac aac ggg atc atg gcc tac gga Gly Glu Asp Trp Asn Ser Val Met Tyr Asn Gly Ile Met Ala Tyr Gly 615 620 625	2109
ggc ccg tcc tac ccg ggc gtt ctc gtg tgc atc tat ttc atc atc ctt Gly Pro Ser Tyr Pro Gly Val Leu Val Cys Ile Tyr Phe Ile Ile Leu 630 635 640	2157
ttt gtc tgc ggc aac tat atc ctg ctg aat gtc ttc ctg gcc atc gcc Phe Val Cys Gly Asn Tyr Ile Leu Leu Asn Val Phe Leu Ala Ile Ala 645 650 655 660	2205
gtg gac aac ctg gcc gag gcg gag agc ctg act tcc gcg caa aag gcc Val Asp Asn Leu Ala Glu Ala Glu Ser Leu Thr Ser Ala Gln Lys Ala 665 670 675	2253
aag gcc gag gag agg aaa cgc agg aag atg tcc agg ggt ctc cct gac Lys Ala Glu Glu Arg Lys Arg Arg Lys Met Ser Arg Gly Leu Pro Asp 680 685 690	2301
aag aca gag gag gag aag tct gtg atg gcc aag aag ctg gag cag aag Lys Thr Glu Glu Glu Lys Ser Val Met Ala Lys Lys Leu Glu Gln Lys 695 700 705	2349
ccc aag ggg gag ggc atc ccc acc act gcc aag ctc aag gtc gat gag Pro Lys Gly Glu Gly Ile Pro Thr Thr Ala Lys Leu Lys Val Asp Glu 710 715 720	2397
ttc gaa tct aac gtc aac gag gtg aag gac ccc tac cct tca gct gac Phe Glu Ser Asn Val Asn Glu Val Lys Asp Pro Tyr Pro Ser Ala Asp 725 730 735 740	2445
ttc cca ggg gat gat gag gag gac gag cct gag atc cca gtg agc ccc Phe Pro Gly Asp Asp Glu Glu Asp Glu Pro Glu Ile Pro Val Ser Pro 745 750 755	2493
cga ccg cgc ccg ctg gcc gag ctg cag ctc aaa gag aag gca gtg ccc Arg Pro Arg Pro Leu Ala Glu Leu Gln Leu Lys Glu Lys Ala Val Pro 760 765 770	2541
atc ccg gaa gcc agc tcc ttc ttc atc ttc agt ccc acc aat aag gtc Ile Pro Glu Ala Ser Ser Phe Phe Ile Phe Ser Pro Thr Asn Lys Val 775 780 785	2589
cgt gtc ctg tgt cac cgc atc gtc aac gcc acc tgg ttc acc aac ttc Arg Val Leu Cys His Arg Ile Val Asn Ala Thr Trp Phe Thr Asn Phe 790 795 800	2637
atc ctg ctc ttc atc ctg ctc agc agt gct gcg ctg gcc gcc gag gac Ile Leu Leu Phe Ile Leu Leu Ser Ser Ala Ala Leu Ala Ala Glu Asp 805 810 815 820	2685

ccc atc cgg gcg gag tcc gtg agg aat cag atc ctt gga tat ttt gat Pro Ile Arg Ala Glu Ser Val Arg Asn Gln Ile Leu Gly Tyr Phe Asp 825 830 835	2733
att gcc ttc acc tct gtc ttc act gtg gag att gtc ctc aag atg acg Ile Ala Phe Thr Ser Val Phe Thr Val Glu Ile Val Leu Lys Met Thr 840 845 850	2781
acc tac ggc gcc ttc ctg cac aag ggc tcc ttc tgc cgc aac tac ttc Thr Tyr Gly Ala Phe Leu His Lys Gly Ser Phe Cys Arg Asn Tyr Phe 855 860 865	2829
aac atc ctg gac ctg ctg gtg gtg gct gtg tct ctc atc tcc atg ggt Asn Ile Leu Asp Leu Leu Val Val Ala Val Ser Leu Ile Ser Met Gly 870 875 880	2877
ctc gag tcc agc acc atc tcc gtg gta aag atc ctg aga gtg cta agg Leu Glu Ser Ser Thr Ile Ser Val Val Lys Ile Leu Arg Val Leu Arg 885 890 900	2925
gtg ctc cgg ccc ctg cga gcc atc aac aga gcc aaa ggg ttg aag cac Val Leu Arg Pro Leu Arg Ala Ile Asn Arg Ala Lys Gly Leu Lys His 905 910 915	2973
gtg gtc cag tgc gtg ttc gtg gcc atc cgc acc atc ggg aac atc gtc Val Val Gln Cys Val Phe Val Ala Ile Arg Thr Ile Gly Asn Ile Val 920 925 930	3021
ctg gtc acc acg ctc ctg cag ttc atg ttc gcc tgc att ggt gtc cag Leu Val Thr Thr Leu Leu Gln Phe Met Phe Ala Cys Ile Gly Val Gln 935 940 945	3069
ctc ttc aag ggc aag ttc ttc agc tgc aac gac cta tcc aag atg aca Leu Phe Lys Gly Lys Phe Phe Ser Cys Asn Asp Leu Ser Lys Met Thr 950 955 960	3117
gaa gag gag tgc agg ggc tac tac tat gtg tac aag gac ggg gac ccc Glu Glu Glu Cys Arg Gly Tyr Tyr Tyr Val Tyr Lys Asp Gly Asp Pro 965 970 975 980	3165
acg cag atg gag ctg cgc ccc cgc cag tgg ata cac aat gac ttc cac Thr Gln Met Glu Leu Arg Pro Arg Gln Trp Ile His Asn Asp Phe His 985 990 995	3213
ttt gac aac gtg ctg tgc gcc atg atg tgc ctc ttc acg gtg tcc Phe Asp Asn Val Leu Ser Ala Met Met Ser Leu Phe Thr Val Ser 1000 1005 1010	3258
acc ttc gag gga tgg ccc cag ctg ctg tac agg gcc ata gac tcc Thr Phe Glu Gly Trp Pro Gln Leu Leu Tyr Arg Ala Ile Asp Ser 1015 1020 1025	3303
aac gag gag gac atg ggc ccc gtt tac aac aac cga gtg gag atg Asn Glu Glu Asp Met Gly Pro Val Tyr Asn Asn Arg Val Glu Met 1030 1035 1040	3348
gcc atc ttc ttc atc atc tac atc atc ctc att gcc ttc ttc atg Ala Ile Phe Phe Ile Ile Tyr Ile Ile Leu Ile Ala Phe Phe Met 1045 1050 1055	3393
atg aac atc ttt gtg ggc ttt gtc atc gtc acc ttc cag gag cag Met Asn Ile Phe Val Gly Phe Val Ile Val Thr Phe Gln Glu Gln 1060 1065 1070	3438
ggg gag aca gag tac aag aac tgc gag ctg gac aag aac cag cgc Gly Glu Thr Glu Tyr Lys Asn Cys Glu Leu Asp Lys Asn Gln Arg 1075 1080 1085	3483
cag tgt gtg cag tat gcc ctg aag gcc cgc cca ctt cgg tgc tac Gln Cys Val Gln Tyr Ala Leu Lys Ala Arg Pro Leu Arg Cys Tyr 1090 1095 1100	3528
atc ccc aag aac cca tac cag tac cag gtg tgg tac gtc gtc acc Ile Pro Lys Asn Pro Tyr Gln Tyr Gln Val Trp Tyr Val Val Thr 1105 1110 1115	3573



tcc tcc tac ttt gaa tac ctg atg ttc gcc ctc atc atg ctc aac Ser Ser Tyr Phe 1120 Glu Tyr Leu Met Phe 1125 Ala Leu Ile Met Leu Asn 1130	3618
acc atc tgc ctg ggc atg cag cac tac cac cag tgc gag gag atg Thr Ile Cys Leu 1135 Gly Met Gln His Tyr 1140 His Gln Ser Glu Glu Met 1145	3663
aac cac atc tgc gac atc ctc aac gtg gcc ttc acc atc atc ttc Asn His Ile Ser 1150 Asp Ile Leu Asn Val 1155 Ala Phe Thr Ile Ile Phe 1160	3708
aca ctg gag atg atc ctc aag ctc ttg gcg ttc aag gcc agg ggc Thr Leu Glu Met 1165 Ile Leu Lys Leu Leu 1170 Ala Phe Lys Ala Arg Gly 1175	3753
tat ttc gga gac ccc tgg aat gtg ttc gac ttc ctg atc gtc atc Tyr Phe Gly Asp 1180 Pro Trp Asn Val Phe 1185 Asp Phe Leu Ile Val Ile 1190	3798
ggc agc atc att gac gtc atc ctc agc gag atc gac act ttc ctg Gly Ser Ile 1195 Asp Val Ile Leu Ser 1200 Glu Ile Asp Thr Phe Leu 1205	3843
gcc tcc agc ggg gga ctg tat tgc ctg ggt ggc ggc tgc ggg aac Ala Ser Ser Gly 1210 Gly Leu Tyr Cys Leu 1215 Gly Gly Gly Cys Gly Asn 1220	3888
gtt gac cca gac gag agc gcc cgc atc tcc agt gcc ttc ttc cgc Val Asp Pro Asp 1225 Glu Ser Ala Arg Ile 1230 Ser Ser Ala Phe Phe Arg 1235	3933
ctg ttc cgg gtc atg agg ctg atc aag ctg ctg agt cgg gcc gag Leu Phe Arg Val 1240 Met Arg Leu Ile Lys 1245 Leu Leu Ser Arg Ala Glu 1250	3978
ggc gtg cgc acg ctg ctg tgg acg ttc atc aag tcc ttc cag gcc Gly Val Arg Thr 1255 Leu Leu Trp Thr Phe 1260 Ile Lys Ser Phe Gln Ala 1265	4023
ctg ccc tac gtg ggc ctg ctc atc gtc atg ctg ttc ttc atc tac Leu Pro Tyr Val 1270 Ala Leu Leu Ile Val 1275 Met Leu Phe Phe Ile Tyr 1280	4068
gcc gtc atc ggc atg cag atg ttt gga aag atc gcc ctg gtg gac Ala Val Ile Gly 1285 Met Gln Met Phe Gly 1290 Lys Ile Ala Leu Val Asp 1295	4113
ggg acc cag atc aac cgc aac aac aac ttc cag acc ttc ccg cag Gly Thr Gln Ile 1300 Asn Arg Asn Asn Asn 1305 Phe Gln Thr Phe Pro Gln 1310	4158
gcc gtg ctg ctg ctc ttc agg tgt gcg aca ggg gag gcg tgg caa Ala Val Leu Leu 1315 Leu Phe Arg Cys Ala 1320 Thr Gly Glu Ala Trp Gln 1325	4203
gag atc ctg ctg gcc tgc agc tac ggg aag ttg tgc gac cca gag Glu Ile Leu Leu 1330 Ala Cys Ser Tyr Gly 1335 Lys Leu Cys Asp Pro Glu 1340	4248
tca gac tac gcc ccg ggc gag gag tac acg tgt ggc acc aac ttc Ser Asp Tyr Ala 1345 Pro Gly Glu Glu Tyr 1350 Thr Cys Gly Thr Asn Phe 1355	4293
gcc tac tac tac ttc atc agc ttc tac atg ctc tgc gcc ttc ctg Ala Tyr Tyr Tyr 1360 Phe Ile Ser Phe Tyr 1365 Met Leu Cys Ala Phe Leu 1370	4338
atc atc aac ctc ttc gtg gct gtc atc atg gac aac ttt gac tac Ile Ile Asn Leu 1375 Phe Val Ala Val Ile 1380 Met Asp Asn Phe Asp Tyr 1385	4383
ctg aca cgc gac tgg tcc atc ctg ggc cct cac cac ctg gac gag Leu Thr Arg Asp 1390 Trp Ser Ile Leu Gly 1395 Pro His His Leu Asp Glu 1400	4428

ttc aag gct atc	tgg gca gag tat	gac cca gag gcc aag ggg cga	4473
Phe Lys Ala Ile	Trp Ala Glu Tyr	Pro Glu Ala Lys Gly Arg	
1405	1410	1415	
atc aag cac ctg	gac gtg gtg acc	ctg ctg aga agg atc cag ccc	4518
Ile Lys His Leu	Asp Val Val Thr	Leu Arg Arg Ile Gln Pro	
1420	1425	1430	
cct ctg ggc ttc	ggg aag ttc tgt	cca cac cgg gtg gcc tgt aag	4563
Pro Leu Gly Phe	Gly Lys Phe Cys	Pro His Arg Val Ala Cys Lys	
1435	1440	1445	
cgc ctg gtg ggc	atg aac atg ccc	ctg aac agt gac ggc acg gtc	4608
Arg Leu Val Gly	Met Asn Met Pro	Leu Asn Ser Asp Gly Thr Val	
1450	1455	1460	
acc ttc aat gcc	acg ctc ttt gcc	ctg gtg cgc acg gcc ctc aag	4653
Thr Phe Asn Ala	Thr Leu Phe Ala	Val Arg Thr Ala Leu Lys	
1465	1470	1475	
atc aag aca gaa	ggg aac ttt gag	cag gcc aac gag gag ctg agg	4698
Ile Lys Thr Glu	Gly Asn Phe Glu	Ala Asn Glu Glu Leu Arg	
1480	1485	1490	
gcc atc atc aag	aag atc tgg aag	aga acc agc atg aag ctg ctg	4743
Ala Ile Ile Lys	Lys Ile Trp Lys Arg	Thr Ser Met Lys Leu Leu	
1495	1500	1505	
gac cag gtc atc	cct ccc ata gga	gat gac gag gtg acc gtg ggg	4788
Asp Gln Val Ile	Pro Pro Ile Gly Asp	Asp Glu Val Thr Val Gly	
1510	1515	1520	
aag ttc tac gcc	aca ttc ctc atc	cag gag cac ttc cgg aag ttc	4833
Lys Phe Tyr Ala	Thr Phe Leu Ile	Gln Glu His Phe Arg Lys Phe	
1525	1530	1535	
atg aag cgc cag	gag gaa tat tat	ggg tat cgg ccc aag aag gac	4878
Met Lys Arg Glu	Glu Glu Tyr Tyr	Gly Tyr Arg Pro Lys Lys Asp	
1540	1545	1550	
acc gtg cag atc	cag gct ggg ctg	cgg acc ata gag gag gag gcg	4923
Thr Val Gln Ile	Gln Ala Gly Leu Arg	Thr Ile Glu Glu Glu Ala	
1555	1560	1565	
gcc cct gag atc	cgc cgc acc atc	tca gga gac ctg acc gcc gag	4968
Ala Pro Glu Ile	Arg Arg Thr Ile	Ser Gly Asp Leu Thr Ala Glu	
1570	1575	1580	
gag gag ctg gag	aga gcc atg gtg	gag gct gcg atg gag gag agg	5013
Glu Glu Leu Glu	Arg Ala Met Val	Glu Ala Ala Met Glu Glu Arg	
1585	1590	1595	
atc ttc cgg agg	acg gga ggc ctg	ttt ggc cag gtg gac acc ttc	5058
Ile Phe Arg Arg	Thr Gly Gly Leu	Phe Gly Gln Val Asp Thr Phe	
1600	1605	1610	
ctg gaa agg acc	aac tcc ctg ccc	cgg gtg atg gcc aac caa aga	5103
Leu Glu Arg Thr	Asn Ser Leu Pro	Pro Val Met Ala Asn Gln Arg	
1615	1620	1625	
ccg ctc cag ttt	gct gag ata gaa	atg gaa gag ctt gag tcg cct	5148
Pro Leu Gln Phe	Ala Glu Ile Glu	Met Glu Glu Leu Glu Ser Pro	
1630	1635	1640	
gtc ttc ttg gag	gac ttc cct caa	gat gca aga acc aac cct ctc	5193
Val Phe Leu Glu	Asp Phe Pro Gln	Asp Ala Arg Thr Asn Pro Leu	
1645	1650	1655	
gct cgt gcc aat	acc aac aac gcc	aat gcc aat gtt gcc tat ggc	5238
Ala Arg Ala Asn	Thr Asn Asn Ala	Asn Ala Asn Val Ala Tyr Gly	
1660	1665	1670	
aac agc aac cat	agc aac aac cag	atg ttt tcc agc gtc cac tgt	5283
Asn Ser Asn His	Ser Asn Asn Gln	Met Phe Ser Ser Val His Cys	
1675	1680	1685	



Glu Trp Lys Pro Phe Glu Thr Ile Ile Leu Leu Thr Ile Phe Ala Asn  
 50 55 60  
 Cys Val Ala Leu Ala Val Tyr Leu Pro Met Pro Glu Asp Asp Asn Asn  
 65 70 75 80  
 Ser Leu Asn Leu Gly Leu Glu Lys Leu Glu Tyr Phe Phe Leu Thr Val  
 85 90 95  
 Phe Ser Ile Glu Ala Ala Met Lys Ile Ile Ala Tyr Gly Phe Leu Phe  
 100 105 110  
 His Gln Asp Ala Tyr Leu Arg Ser Gly Trp Asn Val Leu Asp Phe Ile  
 115 120 125  
 Ile Val Phe Leu Gly Val Phe Thr Ala Ile Leu Glu Gln Val Asn Val  
 130 135 140  
 Ile Gln Ser Asn Thr Ala Pro Met Ser Ser Lys Gly Ala Gly Leu Asp  
 145 150 155 160  
 Val Lys Ala Leu Arg Ala Phe Arg Val Leu Arg Pro Leu Arg Leu Val  
 165 170 175  
 Ser Gly Val Pro Ser Leu Gln Val Val Leu Asn Ser Ile Phe Lys Ala  
 180 185 190  
 Met Leu Pro Leu Phe His Ile Ala Leu Leu Val Leu Phe Met Val Ile  
 195 200 205  
 Ile Tyr Ala Ile Ile Gly Leu Glu Leu Phe Lys Gly Lys Met His Lys  
 210 215 220  
 Thr Cys Tyr Tyr Ile Gly Thr Asp Ile Val Ala Thr Val Glu Asn Glu  
 225 230 235 240  
 Lys Pro Ser Pro Cys Ala Arg Thr Gly Ser Gly Arg Pro Cys Thr Ile  
 245 250 255  
 Asn Gly Ser Glu Cys Arg Gly Gly Trp Pro Gly Pro Asn His Gly Ile  
 260 265 270  
 Thr His Phe Asp Asn Phe Gly Phe Ser Met Leu Thr Val Tyr Gln Cys  
 275 280 285  
 Ile Thr Met Glu Gly Trp Thr Asp Val Leu Tyr Trp Val Asn Asp Ala  
 290 295 300  
 Ile Gly Asn Glu Trp Pro Trp Ile Tyr Phe Val Thr Leu Ile Leu Leu  
 305 310 315 320  
 Gly Ser Phe Phe Ile Leu Asn Leu Val Leu Gly Val Leu Ser Gly Glu  
 325 330 335  
 Phe Thr Lys Glu Arg Glu Lys Ala Lys Ser Arg Gly Thr Phe Gln Lys  
 340 345 350

Leu Arg Glu Lys Gln Gln Leu Glu Glu Asp Leu Arg Gly Tyr Met Ser  
 355 360 365  
 Trp Ile Thr Gln Gly Glu Val Met Asp Val Glu Asp Leu Arg Glu Gly  
 370 375 380  
 Lys Leu Ser Leu Glu Glu Gly Gly Ser Asp Thr Glu Ser Leu Tyr Glu  
 385 390 395 400  
 Ile Glu Gly Leu Asn Lys Ile Ile Gln Phe Ile Arg His Trp Arg Gln  
 405 410 415  
 Trp Asn Arg Val Phe Arg Trp Lys Cys His Asp Leu Val Lys Ser Arg  
 420 425 430  
 Val Phe Tyr Trp Leu Val Ile Leu Ile Val Ala Leu Asn Thr Leu Ser  
 435 440 445  
 Ile Ala Ser Glu His His Asn Gln Pro Leu Trp Leu Thr His Leu Gln  
 450 455 460  
 Asp Ile Ala Asn Arg Val Leu Leu Ser Leu Phe Thr Ile Glu Met Leu  
 465 470 475 480  
 Leu Lys Met Tyr Gly Leu Gly Leu Arg Gln Tyr Phe Met Ser Ile Phe  
 485 490 495  
 Asn Arg Phe Asp Cys Phe Val Val Cys Ser Gly Ile Leu Glu Leu Leu  
 500 505 510  
 Leu Val Glu Ser Gly Ala Met Thr Pro Leu Gly Ile Ser Val Leu Arg  
 515 520 525  
 Cys Ile Arg Leu Leu Arg Leu Phe Lys Ile Thr Lys Tyr Trp Thr Ser  
 530 535 540  
 Leu Ser Asn Leu Val Ala Ser Leu Leu Asn Ser Ile Arg Ser Ile Ala  
 545 550 555 560  
 Ser Leu Leu Leu Leu Leu Phe Leu Phe Ile Ile Ile Phe Ala Leu Leu  
 565 570 575  
 Gly Met Gln Leu Phe Gly Gly Arg Tyr Asp Phe Glu Asp Thr Glu Val  
 580 585 590  
 Arg Arg Ser Asn Phe Asp Asn Phe Pro Gln Ala Leu Ile Ser Val Phe  
 595 600 605  
 Gln Val Leu Thr Gly Glu Asp Trp Asn Ser Val Met Tyr Asn Gly Ile  
 610 615 620  
 Met Ala Tyr Gly Gly Pro Ser Tyr Pro Gly Val Leu Val Cys Ile Tyr  
 625 630 635 640  
 Phe Ile Ile Leu Phe Val Cys Gly Asn Tyr Ile Leu Leu Asn Val Phe  
 645 650 655

Leu Ala Ile Ala Val Asp Asn Leu Ala Glu Ala Glu Ser Leu Thr Ser  
 660 665 670  
 Ala Gln Lys Ala Lys Ala Glu Glu Arg Lys Arg Arg Lys Met Ser Arg  
 675 680 685  
 Gly Leu Pro Asp Lys Thr Glu Glu Glu Lys Ser Val Met Ala Lys Lys  
 690 695 700  
 Leu Glu Gln Lys Pro Lys Gly Glu Gly Ile Pro Thr Thr Ala Lys Leu  
 705 710 715 720  
 Lys Val Asp Glu Phe Glu Ser Asn Val Asn Glu Val Lys Asp Pro Tyr  
 725 730 735  
 Pro Ser Ala Asp Phe Pro Gly Asp Asp Glu Glu Asp Glu Pro Glu Ile  
 740 745 750  
 Pro Val Ser Pro Arg Pro Arg Pro Leu Ala Glu Leu Gln Leu Lys Glu  
 755 760 765  
 Lys Ala Val Pro Ile Pro Glu Ala Ser Ser Phe Phe Ile Phe Ser Pro  
 770 775 780  
 Thr Asn Lys Val Arg Val Leu Cys His Arg Ile Val Asn Ala Thr Trp  
 785 790 795 800  
 Phe Thr Asn Phe Ile Leu Leu Phe Ile Leu Leu Ser Ser Ala Ala Leu  
 805 810 815  
 Ala Ala Glu Asp Pro Ile Arg Ala Glu Ser Val Arg Asn Gln Ile Leu  
 820 825 830  
 Gly Tyr Phe Asp Ile Ala Phe Thr Ser Val Phe Thr Val Glu Ile Val  
 835 840 845  
 Leu Lys Met Thr Thr Tyr Gly Ala Phe Leu His Lys Gly Ser Phe Cys  
 850 855 860  
 Arg Asn Tyr Phe Asn Ile Leu Asp Leu Leu Val Val Ala Val Ser Leu  
 865 870 875 880  
 Ile Ser Met Gly Leu Glu Ser Ser Thr Ile Ser Val Val Lys Ile Leu  
 885 890 895  
 Arg Val Leu Arg Val Leu Arg Pro Leu Arg Ala Ile Asn Arg Ala Lys  
 900 905 910  
 Gly Leu Lys His Val Val Gln Cys Val Phe Val Ala Ile Arg Thr Ile  
 915 920 925  
 Gly Asn Ile Val Leu Val Thr Thr Leu Leu Gln Phe Met Phe Ala Cys  
 930 935 940  
 Ile Gly Val Gln Leu Phe Lys Gly Lys Phe Phe Ser Cys Asn Asp Leu  
 945 950 955 960

Ser Lys Met Thr Glu Glu Glu Cys Arg Gly Tyr Tyr Tyr Val Tyr Lys  
 965 970 975  
 Asp Gly Asp Pro Thr Gln Met Glu Leu Arg Pro Arg Gln Trp Ile His  
 980 985 990  
 Asn Asp Phe His Phe Asp Asn Val Leu Ser Ala Met Met Ser Leu Phe  
 995 1000 1005  
 Thr Val Ser Thr Phe Glu Gly Trp Pro Gln Leu Leu Tyr Arg Ala  
 1010 1015 1020  
 Ile Asp Ser Asn Glu Glu Asp Met Gly Pro Val Tyr Asn Asn Arg  
 1025 1030 1035  
 Val Glu Met Ala Ile Phe Phe Ile Ile Tyr Ile Ile Leu Ile Ala  
 1040 1045 1050  
 Phe Phe Met Met Asn Ile Phe Val Gly Phe Val Ile Val Thr Phe  
 1055 1060 1065  
 Gln Glu Gln Gly Glu Thr Glu Tyr Lys Asn Cys Glu Leu Asp Lys  
 1070 1075 1080  
 Asn Gln Arg Gln Cys Val Gln Tyr Ala Leu Lys Ala Arg Pro Leu  
 1085 1090 1095  
 Arg Cys Tyr Ile Pro Lys Asn Pro Tyr Gln Tyr Gln Val Trp Tyr  
 1100 1105 1110  
 Val Val Thr Ser Ser Tyr Phe Glu Tyr Leu Met Phe Ala Leu Ile  
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Lys Ala Arg Glu Ser Val Gln Gly Met Ala Ser Val Pro Gly Ser  
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